

Distribution of albatrosses and petrels in the Southern Indian Ocean and the overlap with IOTC longline fisheries

**Summary of presentation to the first meeting of the IOTC Bycatch Working Party,
Phuket, 20 July 2005**

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1. Background

Seabirds are becoming increasingly threatened faster than any other group of birds, largely due to increasing threats to albatross and petrel populations. It has been identified that the principle threat to most species is through being caught as bycatch in pelagic and demersal longline fisheries (Brothers, 1991; Gales, 1993; Weimerskirch *et al*, 1997). Bycatch of albatrosses and petrels occurs when species are attracted to fishing vessels to feed on offal and bait, attempt to dive on the baited hooks during setting, become caught and drown. Albatross and petrel populations are long-lived and have low reproductive rates, meaning that they are highly vulnerable to increased adult mortality. Nineteen of the 21 species of albatross are currently under global threat of extinction (IUCN red list).

Albatrosses travel vast distances across the oceans, and consequently, as for highly migratory fish stocks, their protection depends on collaboration between States. Regional Fisheries Management Organisations (RFMOs) have a central role to play in the conservation of albatross and petrel species, managing a number of the fisheries that are known, or likely, to be killing substantial numbers of albatrosses and petrels each year.

CCAMLR has demonstrated the scale of achievement that is possible through action by an RFMO, having reduced albatross and petrel bycatch in its regulated fisheries by over 99%. Under the international legal framework for the oceans (UN Fish Stocks Agreement, FAO Code of Conduct for Responsible Fisheries), other RFMOs also have the duty to take action to minimise bycatch of vulnerable non-target species such as albatrosses and petrels.

2. Albatross and petrel distribution

BirdLife International has coordinated the establishment of The Global Procellariiform Tracking Database, in which scientists from around the world have collaborated to assemble and analyse over 90% of the world's remote-tracking data of albatrosses and petrels (BirdLife International, 2004).

Analysis of the data has shown the concentration of albatross and petrel distribution across the world's oceans between 30-50° South, and highlighted the importance of the Southwest Indian Ocean (Fig1). The area managed by IOTC includes 21% of the global breeding distribution of albatrosses, making it one of the most important RFMOs for albatross distribution (Table 1).

The Southern Indian Ocean is also used by many non-breeding albatrosses, including Shy albatrosses from the Auckland Islands, New Zealand, and Black-browed, Grey-headed and Atlantic Yellow-nosed albatrosses from the Atlantic, as well as non-breeding birds from islands in the Southern Indian Ocean. Non-breeding birds are less tied to proximity to breeding colonies, and are often found further north, closer to the South African coast, and with greater overlap with the pelagic longline fisheries.

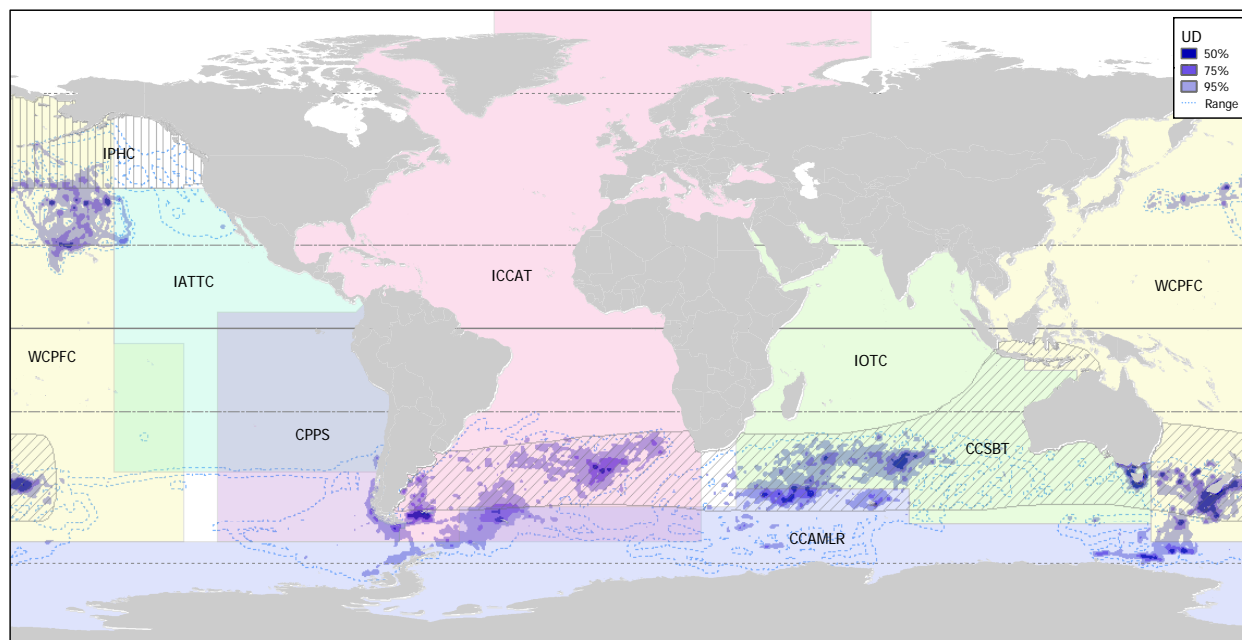


Fig 1. Density distribution of breeding albatrosses in relation to the areas managed by selected RFMOs. The utilisation distribution (UD) provides a probability contour indicating the relative amount of time that birds spend in a particular area i.e. they will spend 50% of their time within the 50% UD. The dotted line represents the entire range, or 100% UD. This composite. Figure reproduced from *Tracking Ocean Wanderers* (BirdLife, 2004), with permission from the dataholders.

Table 1. Top RFMOs in relation to breeding albatross distribution (% time), and longline fishing effort below 30°S (area of overlap) managed by each RFMO.

	Ocean	Breeding albatross distribution (%)	Longline fishing effort below 30°S
CCSBT	All, 30-50° S	67 %	120-130 million hooks
WCPFC	West Pacific	46 %	Approx. 30 million hooks ¹
IOTC	Indian	21 %	75-100 million hooks
ICCAT	Atlantic	17 %	Approx. 100 million hooks
CCAMLR	Southern	16 %	100-120 million hooks

¹ Unlike the other RFMOs, the WCPFC also has albatross distribution above 30S. Fishing effort shown here indicates only that proportion below 30S, but does not indicate the full extent of overlap with WCPFC longline fisheries.

3. Overlap with IOTC pelagic longline fisheries

Data from the IOTC databases indicate that pelagic longline fishing effort below 30°S has amounted to between 75-100 million hooks in recent years (Fig 2). The main fishing fleets belong to Japan and Taiwan. In the past, Taiwanese vessels have typically been distributed to the north of the Japanese vessels, principally targeting Albacore, while the Japanese vessels have principally targeted Southern Bluefin Tuna (IOTC databases).

Figure 3 indicates variations in pelagic fishing effort throughout the year compared to overall albatross breeding distribution. Fishing effort below 30°S (and hence overlap with albatross distribution) is greatest in the 2nd & 3rd quarter of each year. This also coincides with the periods of greatest densities of non-breeding albatrosses within the area (not shown in albatross distribution in Figure 3). These non-breeders include Shy albatrosses from the Auckland Islands, and Black-browed albatrosses from South Georgia in the Atlantic.

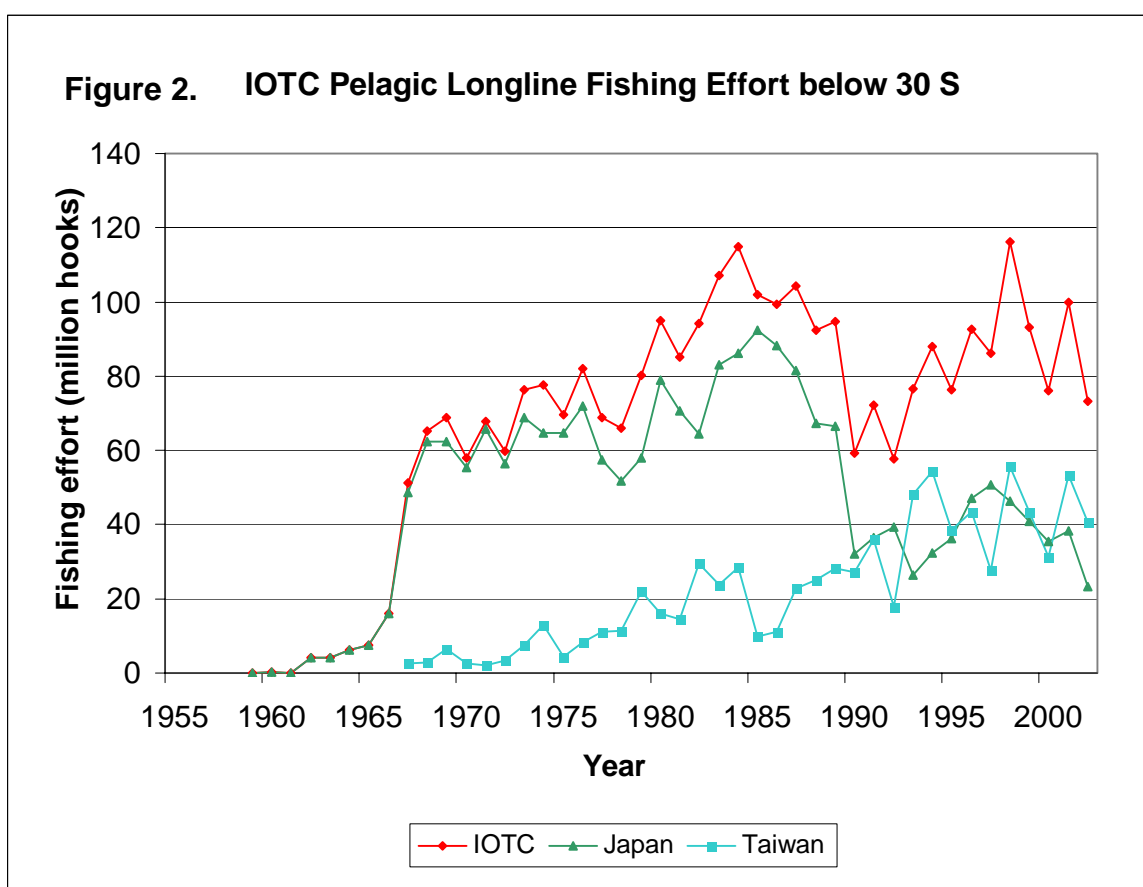
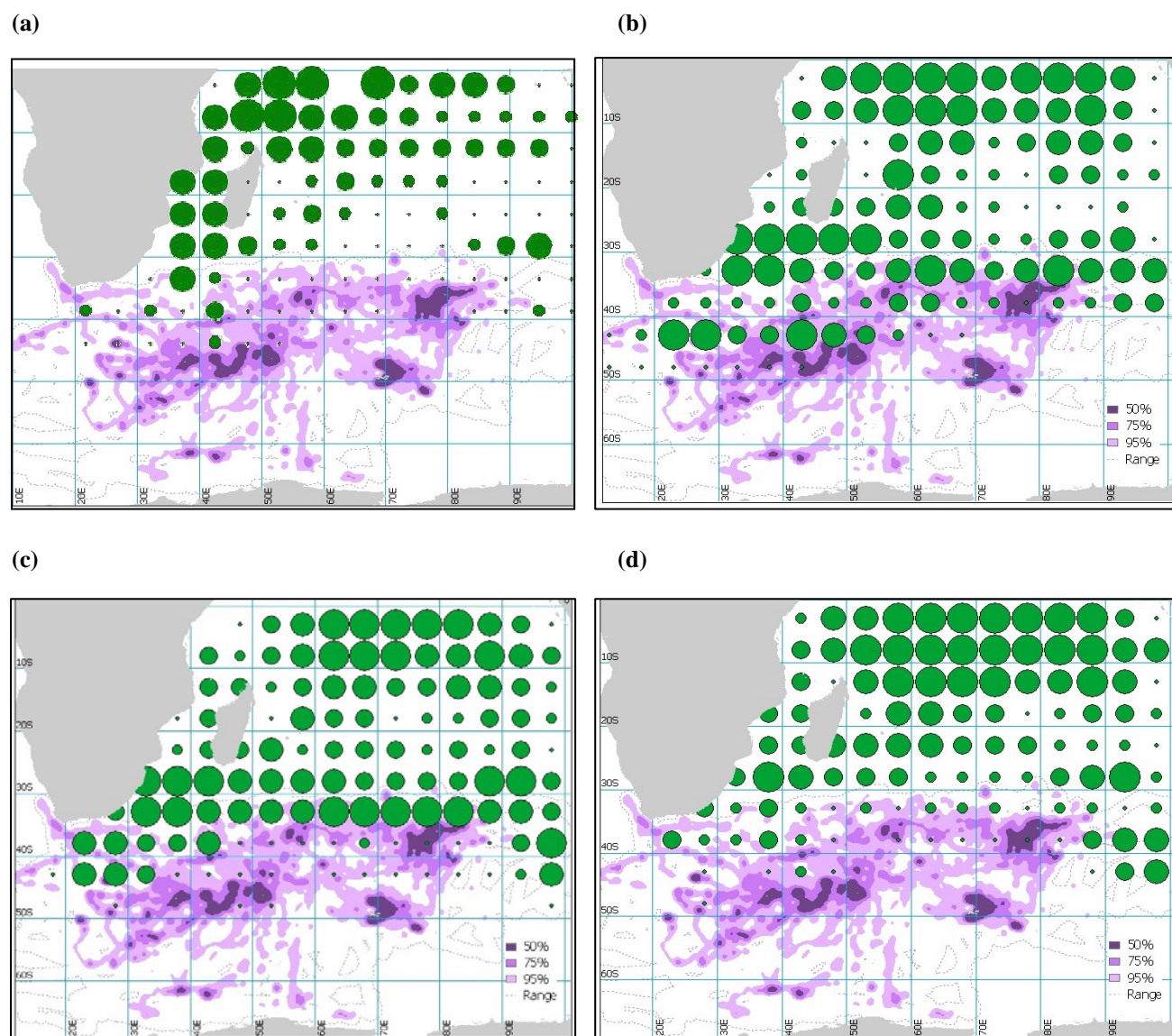


Fig 3. Overlap between distribution of breeding albatrosses in the Southern Indian Ocean and IOTC pelagic longline fishing effort by quarter year (1999-2002), indicating greatest overlap in the 2nd and 3rd quarters.

Fishing effort data from IOTC database, and summarised by 20 percentiles. (a) first quarter (Jan-March), (b) second quarter (April-June), (c) third quarter (July-Sept), (d) fourth quarter (Oct-Dec).



4. Links between seabird populations in the Southern Indian Ocean and pelagic longline fishing effort.

Currently there are few bycatch data for the Indian Ocean, though data do exist (including Japanese Real Time Monitoring Program, and data collected by BirdLife South Africa).

However, the population trends from seabird population colonies are known. Population models have identified significant links between seabird population trends (for example on Marion Island and Ile Crozet) and trends in longline fishing effort (Nel *et al* 2002; Tuck *et al* 2001; Tuck *et al*, 2004). These models are based on measures of adult survival rates, not bycatch data.

Further bycatch data are critically needed in order to understand the rates of bycatch of albatross and petrel bycatch in the Southern Indian Ocean, and the rates associated with each fishery.

5. Key needs for consideration by the IOTC Bycatch Working Party

- Set a time frame for a preliminary assessment of the impact of the incidental catch of seabirds by vessels fishing for tuna in the IOTC area, as outlined in the IOTC Recommendation on Seabirds 2005, and seek approval for collaboration with BirdLife International (holder of the Global Procellariiform Tracking Database) and seabird experts
- Express the support of WPBy for the development of an IOTC regional observer program, emphasising the benefit of a regional program with established observer data standards and independent observers
- In light of the fact that the main IOTC fishing fleets fishing below 30S (Japan and Taiwan) already have mandatory requirements for Tori lines south of 30°S, IOTC should urgently establish the requirement that longline vessels must deploy a Tori line south of 30°S, and that this Tori line should conform to the standards established by CCAMLR.

References:

- BirdLife International, 2004. Tracking Ocean Wanderers: the global distribution of albatrosses and petrels. Results from the Global Procellariiform Tracking Workshop, 1-5 September 2003, Gordon's Bay, South Africa. Cambridge, UK, BirdLife International.
- Brothers, N., 1991. Albatross mortality and associated bait loss in the Japanese longline fishery in the Southern Ocean. *Biological Conservation* 55: 255-268.
- Gales, R., 1993. Cooperative mechanisms for the conservation of the albatross. Australian Nature Conservation Agency Review. Tasmanian Government Printer, Hobart.
- Nel, D.C., Ryan, P., Crawford, R., Cooper, J., Huser, O.A.W., 2002. Population trends of albatrosses and petrels at sub-Antarctic Marion Island. *Polar Biology* 25: 81-89.
- Tuck, G.N., Polachek, T., Croxall, J.P., Weimerskirch, H. 2001. Modelling the impact of fishery by-catches on albatross populations. *Journal of Applied Ecology* 38: 1182-1196.
- Tuck, G.N., 2004. A comprehensive study of the ecological impacts of the worldwide pelagic longline industry: Southern Hemisphere studies. Hobart. CSIRO Marine Research. 243p.
- Weimerskirch, H., Brothers, N., Jouventin, P., 1997. Population dynamics of Wandering Albatross *Diomedea exulans* and Amsterdam Albatross *D. amsterdamensis* in the Indian Ocean and their relationships with long-line fisheries: conservation implications. *Biological Conservation* 79: 257-270.

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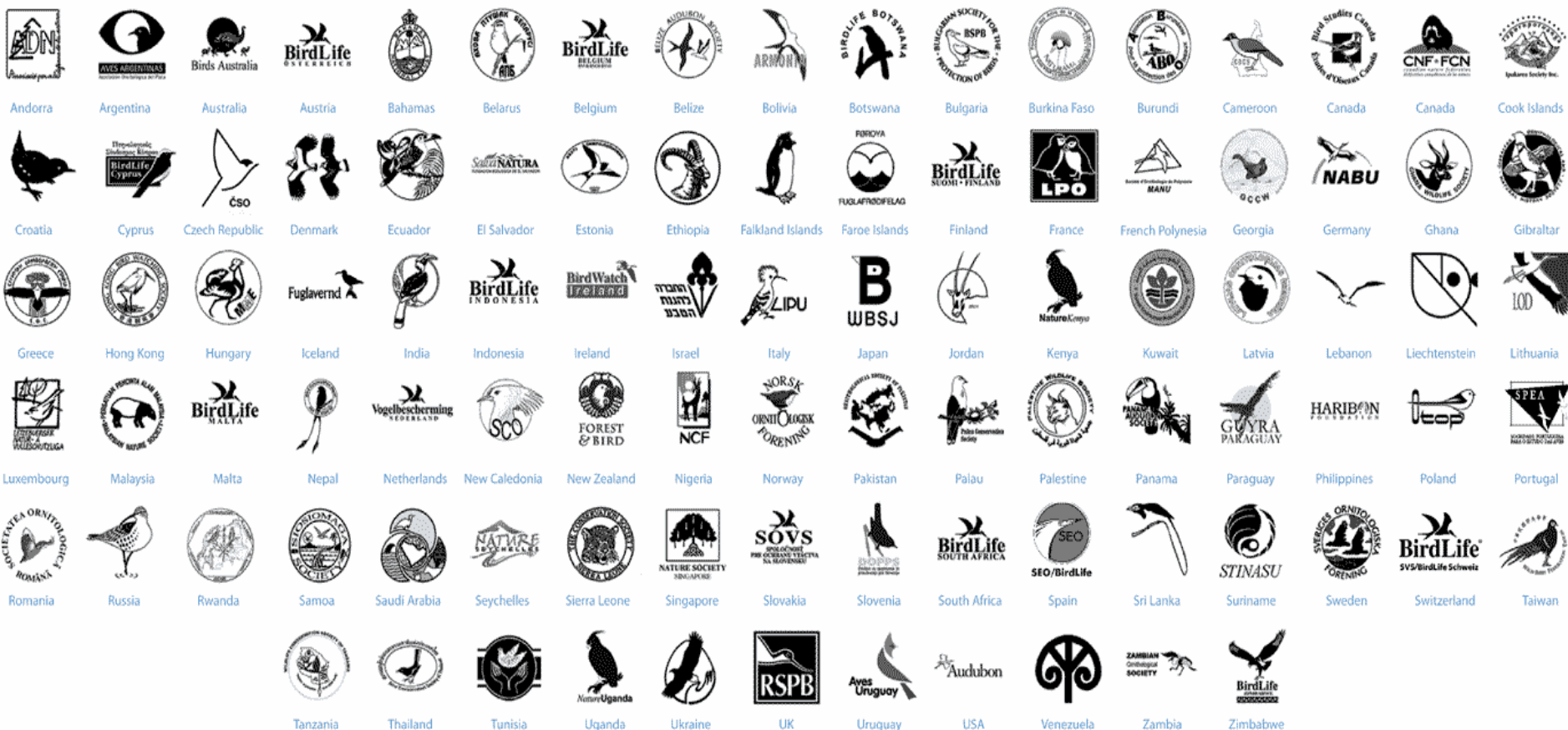


BirdLife International

Global Seabird Programme



THE BIRDLIFE INTERNATIONAL PARTNERSHIP





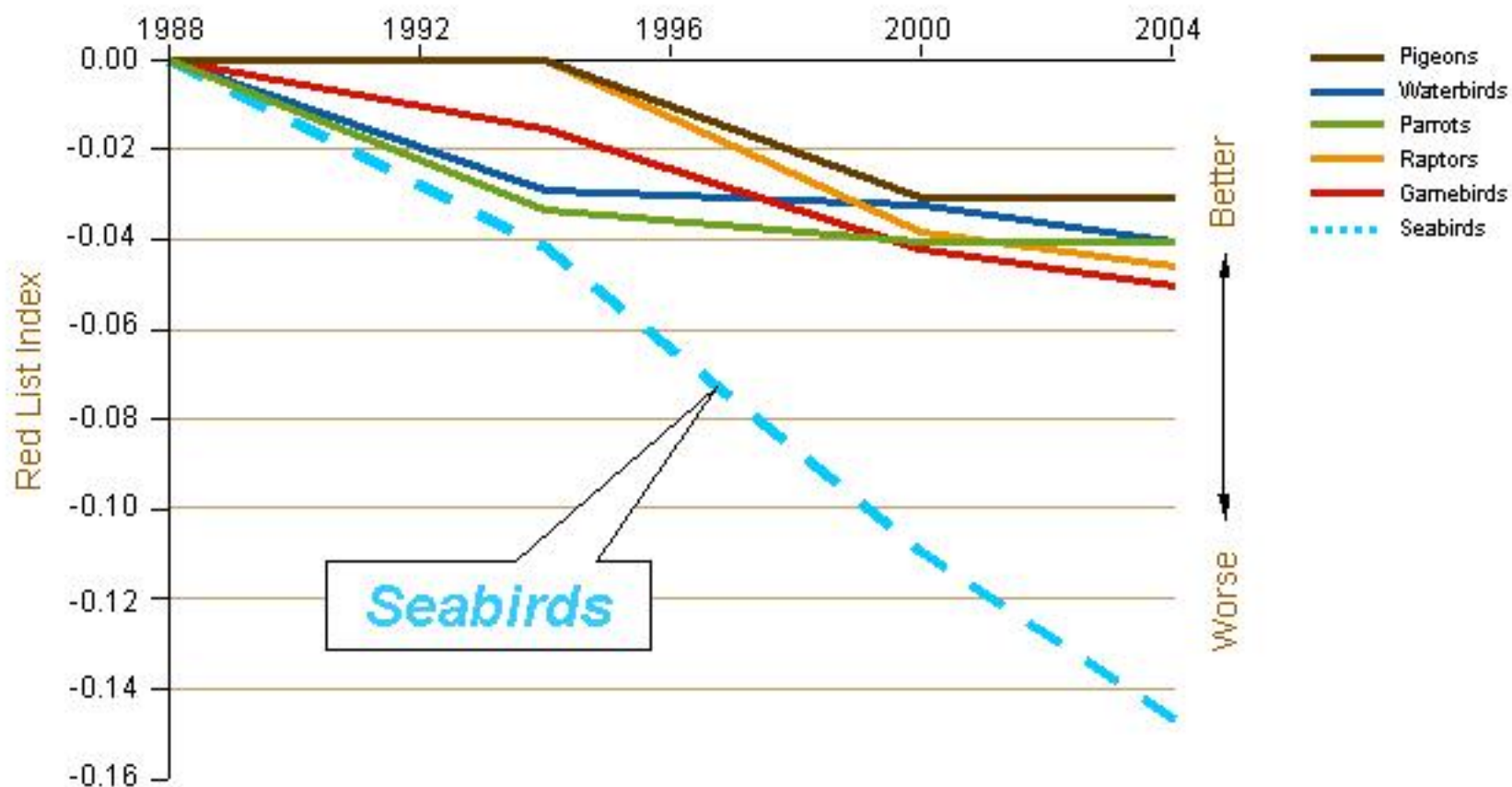
Distribution of albatrosses & petrels in the Southern Indian Ocean & overlap with IOTC longline fisheries



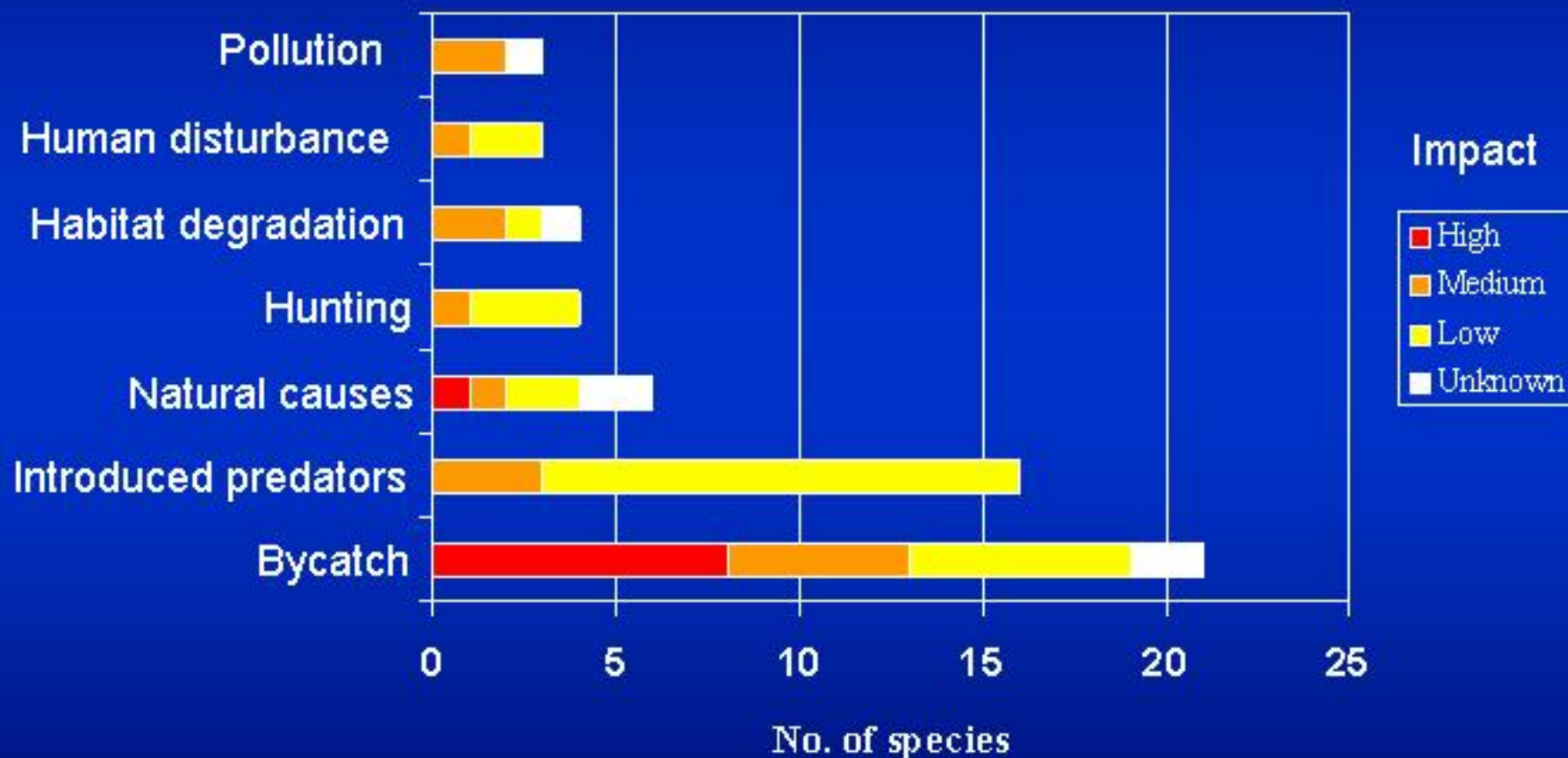
Overview

1. **Background: threats to albatrosses and petrels**
2. **Indian Ocean: What we know**
3. **Indian Ocean: What we don't know**
4. **Suggestions for Recommendations**

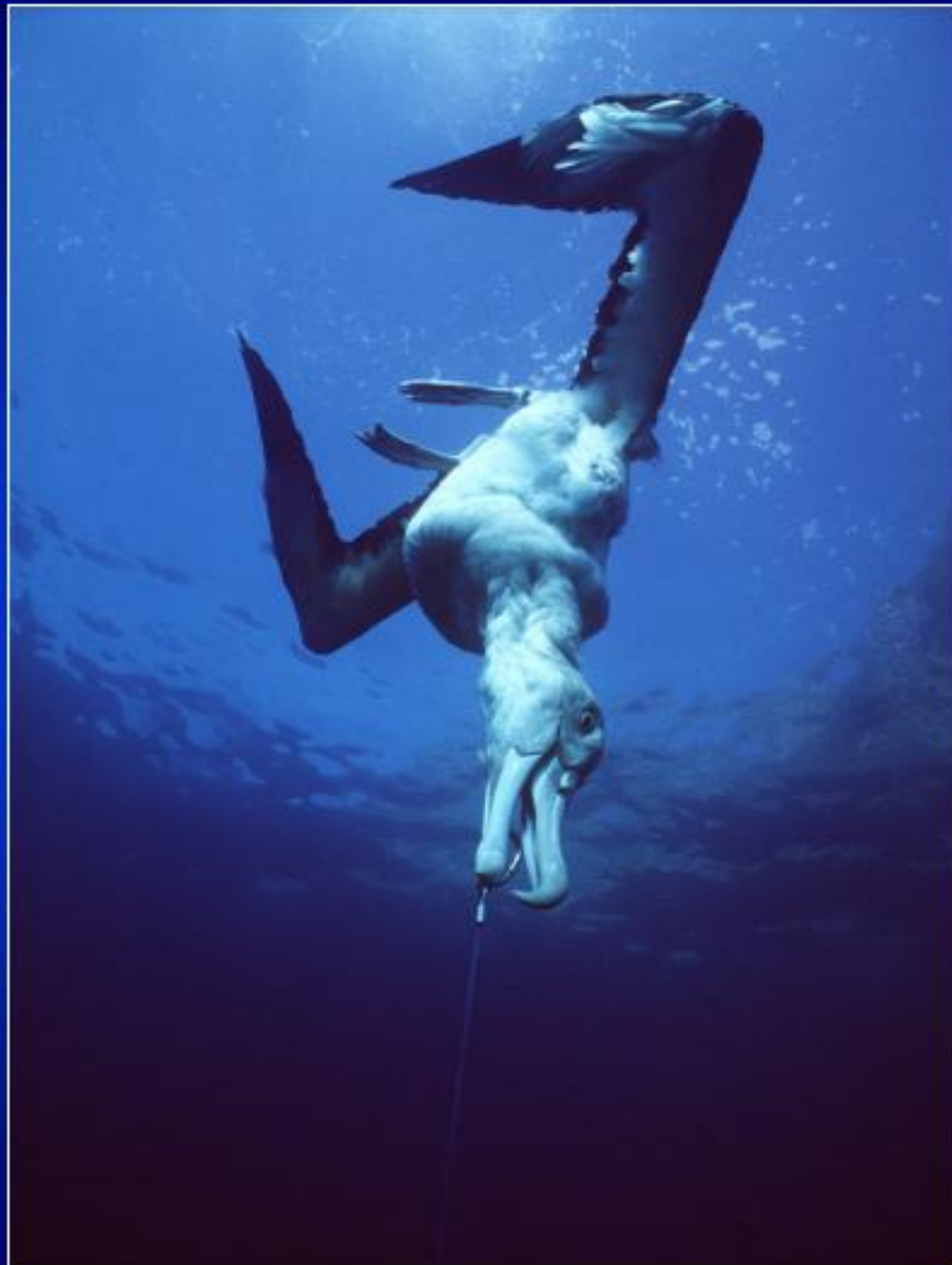
Red List Indices for selected species-groups



Threats to albatrosses and petrels











More than 300 000
birds per year killed

Albatross vulnerability

- Long-lived
- Delayed sexual maturity
- Slow breeding
- Small populations

**19 of 21 species of
albatross now threatened
with extinction**



Good News

- Effective methods to reduce seabird bycatch

Importance of IOTC and other RFMOs

- Central role for RFMOs
- International legal framework for the oceans sets duties for States to cooperate through RFMOs to minimise bycatch of non-target species

CCAMLR

99% reduction in seabird bycatch



1997 = 6589 birds

2003 = 15 birds

Source: CCAMLR, 2003

INDIAN OCEAN & IOTC

WHAT WE KNOW

1. ALBATROSS DISTRIBUTION

Southern Indian Ocean is an important area for albatrosses

Global Albatross & Petrel Satellite Tracking Database

Over 90% global existing satellite tracking data



Data contributors

PTT Data Contributors:

Wandering, Blackbrowed, Sooty Albatross and Whitechinned Petrel (Crozet and Kerguelen Islands), Blackbrowed, Greyheaded and Southern Royal Albatross (Campbell Island), Lightmantled Albatross (Crozet Islands, Macquarie Island), Indian Yellow-nosed and Amsterdam Albatross (Amsterdam Island):

Henri Weimerskirch, Centre d'Etudes Biologiques de Chizé, (CNRS UPR 1934), France
Support from Institut Paul-Emile Victor (IPEV - programme 109)

Blackbrowed, Greyheaded and Wandering Albatross, Southern and Northern Giant Petrel and Whitechinned Petrel (South Georgia):

John Croxall, Richard Phillips, Jacob Gonzalez-Solis & Andy Wood, British Antarctic Survey, Natural Environment Research Council

Blackbrowed and Greyheaded Albatross (Chile):

Graham Robertson, Australian Antarctic Division
Javier Arata, Instituto de Ecología y Evolución, Universidad Austral de Chile
Instituto Antártico Chileno

Blackfooted and Laysan Albatross (Hawaii):

Yann Tremblay¹, Scott A. Shaffer¹, Jill Awkerman², Dan P. Costa¹ & Dave J. Anderson²

¹Department of Ecology and Evolutionary Biology, University of California Santa Cruz

²Department of Biology, Wake Forest University
Support from Tagging of Pacific Pelagics (TOPP) and U.S. Fish & Wildlife Service, Honolulu

Laysan Albatross (Mexico):

Bill Henry, Don A. Croll & Scott A. Shaffer
Dept. of Ecology and Evolutionary Biology, University of California Santa Cruz
Support from Island Conservation Ecology Group (ICEG) and Tagging of Pacific Pelagics (TOPP)

Shy Albatross (Tasmania), Greyheaded, Blackbrowed and Lightmantled Albatross (Macquarie Island):

Nigel Brothers, April Hedd, Rosemary Gales & Aleks Terauds, Department of Primary Industries, Water and Environment (DPIWE), Tasmania

Chatham Albatross (New Zealand)

D.G. Nicholls, M.D. Murray & C.J.R. Robertson.
Support from WWF, Ian Potter Foundation, Chisholm Institute, La Trobe University, Department of Conservation, David Bell, Hans Rook

Chatham Albatross (New Zealand)

C.J.R. Robertson, Department of Conservation New Zealand, D.G. Nicholls and M.D. Murray.
Support from Department of Conservation – Conservation Services Program, David Bell

Northern Royal Albatross (New Zealand):

C.J.R. Robertson, D.G. Nicholls & M.D. Murray.
Support from Ian Potter Foundation, WWF Australia, Department of Conservation, David and Mike Bell, Isobel Burns, Sandra McGrouther

Wandering and Greyheaded Albatross (Marion Island):

Deon Nel & Peter Ryan, Percy FitzPatrick Institute, University of Cape Town, South Africa

Blackfooted Albatross (USA):

David Hyrenbach, Scripps Institution of Oceanography, University of California San Diego, USA

Antipodean and Gibson's Albatross (New Zealand)

D.G. Nicholls, M.D. Murray & E.C. Butcher.
Support from Kath Walker, Graeme Elliott, WWF Australia

Antipodean and Gibson's Albatross (New Zealand)

D.G. Nicholls, M.D. Murray, E.C. Butcher, Kath Walker
Graeme Elliott & Department of Conservation New Zealand.
Support from Peter Dilks, Andy Cox, Southland Conservancy, Department of Conservation New Zealand

Wandering Albatross (Australia):

D.G. Nicholls, M.D. Murray & E.C. Butcher.
Support from La Trobe University, Australian Research Council, Ian Potter Foundation, W V West Estate, WWF Australia, Chisholm Institute, Dandenong, SOSSA, Dick Smith Foundation, Environment Australia

Southern Giant Petrel (Antarctic Peninsula):

Donna Patterson & William Fraser, Polar Oceans Research Group, USA

Short-tailed Albatross (Japan):

Rob Suryan, Hatfield Marine Science Center, Oregon State University
Greg Balogh, U.S. Fish & Wildlife Service
Kiyooki Ozaki and Fumio Sato, Yamashina Institute for Ornithology
Shiho Kanie, Nature Conservation Bureau, Ministry of Environment, Japan

Tristan Albatross (Gough):

Richard Cuthbert, Royal Society for the Protection of Birds, UK
Percy FitzPatrick Institute, University of Cape Town, South Africa

Southern Giant Petrel (Argentina):

Flavio Quintana, Centro Nacional Patagónico, Argentina

Blackbrowed Albatross (Falklands):

Nic Huin, Falklands Conservation

Buller's Albatross (New Zealand):

Jean-Claude Stahl, Museum of New Zealand Te Papa Tongarewa
Paul Sagar, National Institute of Water and Atmospheric Research

GLS Data Contributors:

Blackbrowed Albatross (Chile):

John Croxall, Janet Silk, British Antarctic Survey
Javier Arata, Universidad Austral de Chile

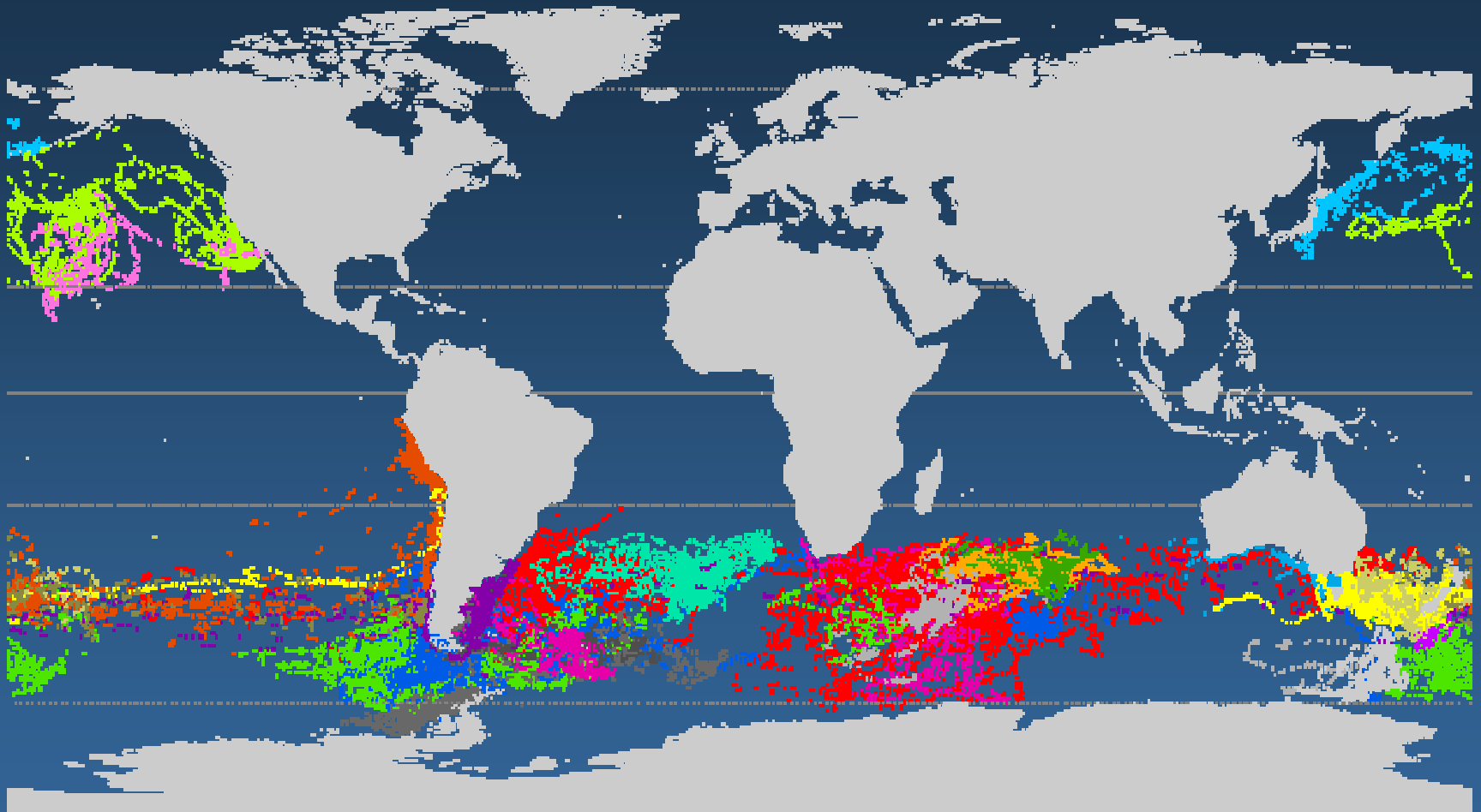
Blackbrowed Albatross (Falklands):

Nic Huin, Falklands Conservation
John Croxall, British Antarctic Survey

Blackbrowed and Greyheaded Albatross (South Georgia)

John Croxall, Richard Phillips, Janet Silk & Dirk Briggs
British Antarctic Survey

Albatross and petrel locations



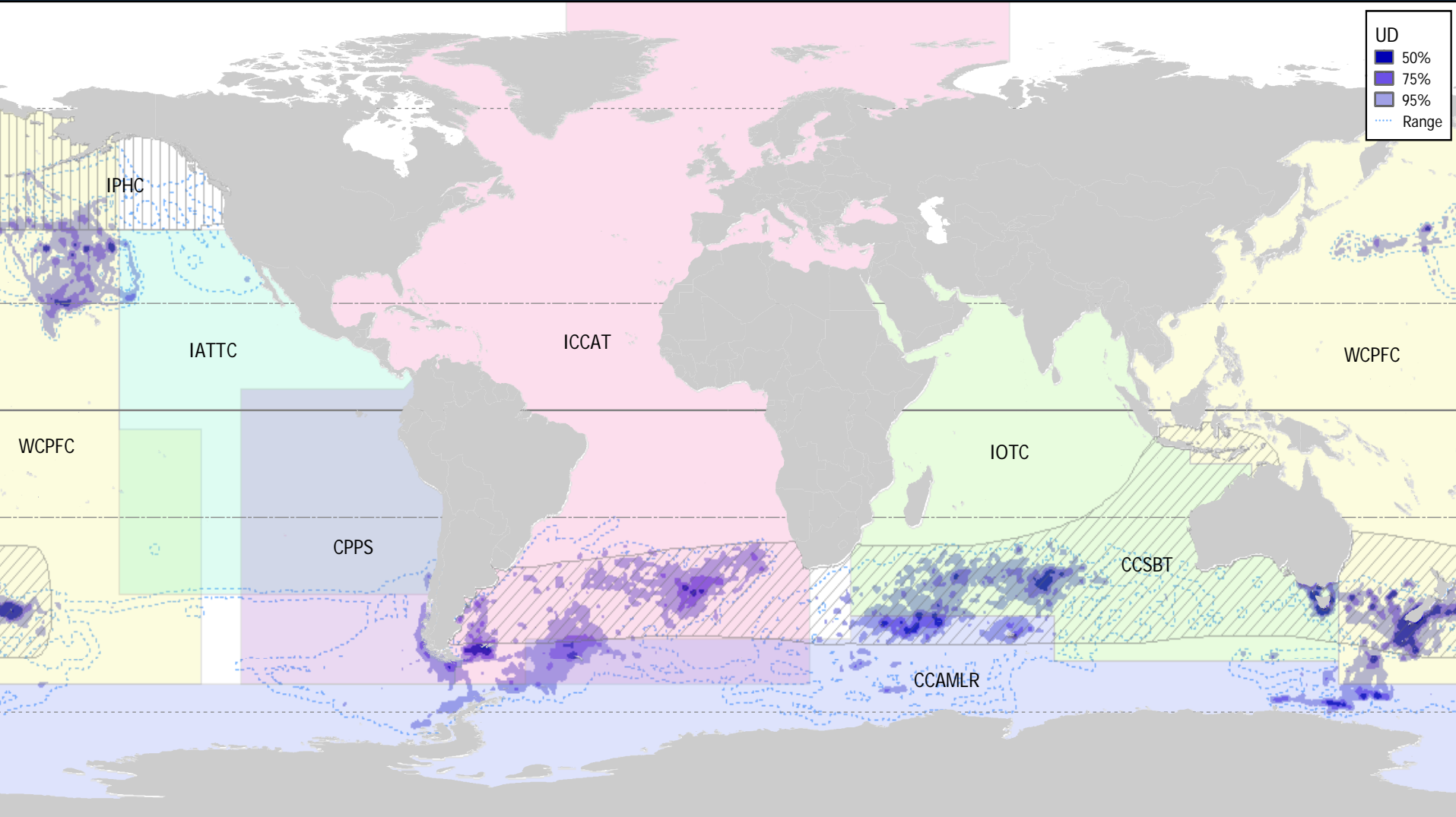
Amsterdam Albatross
Antipodean Albatross
Black-browed Albatross
Black-footed Albatross
Buller's Albatross
Chatham Albatross

Gibson's Albatross
Grey-headed Albatross
Indian Yellow-nosed
Albatross
Laysan Albatross
Light-mantled Albatross

Short-tailed Albatross
Shy Albatross
Sooty Albatross
Northern Giant Petrel
Southern Giant Petrel

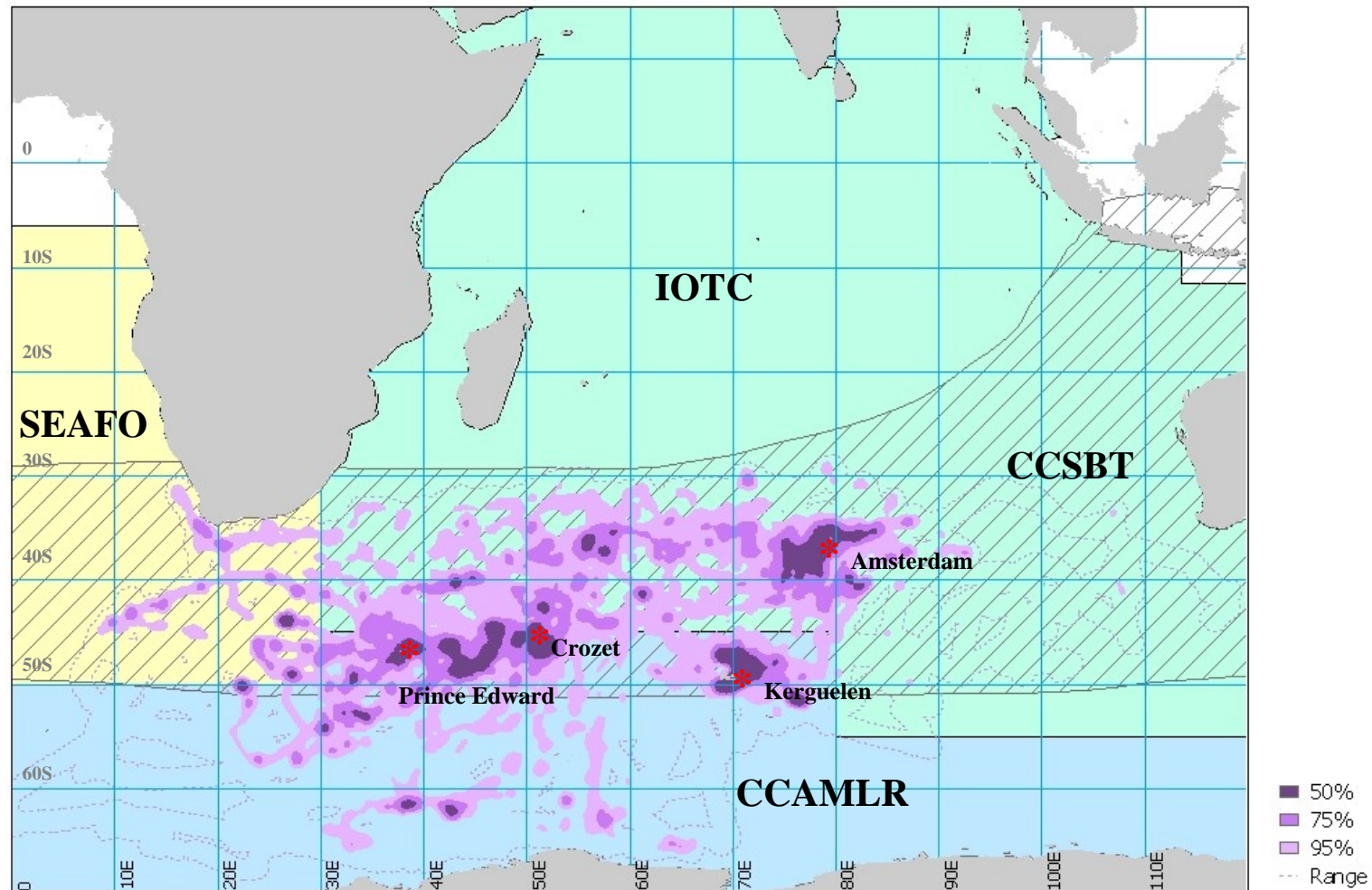
Northern Royal Albatross
Southern Royal Albatross
Tristan Albatross
Wandering Albatross
White-chinned Petrel

Albatross distribution (breeding season)

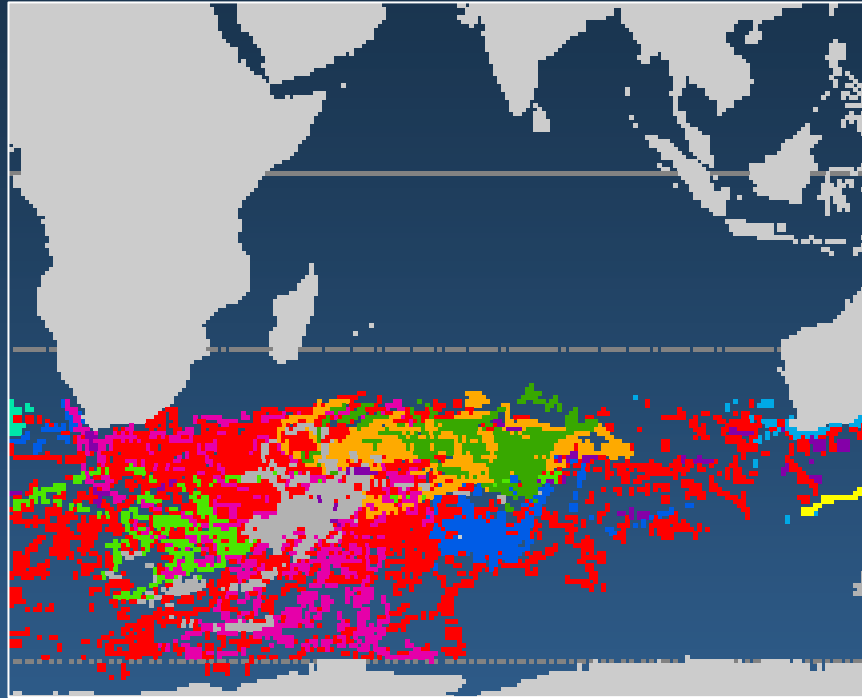


IOTC area = 21% global albatross distribution

Albatrosses in S. Indian Ocean (breeding season)



Non-breeding distribution?

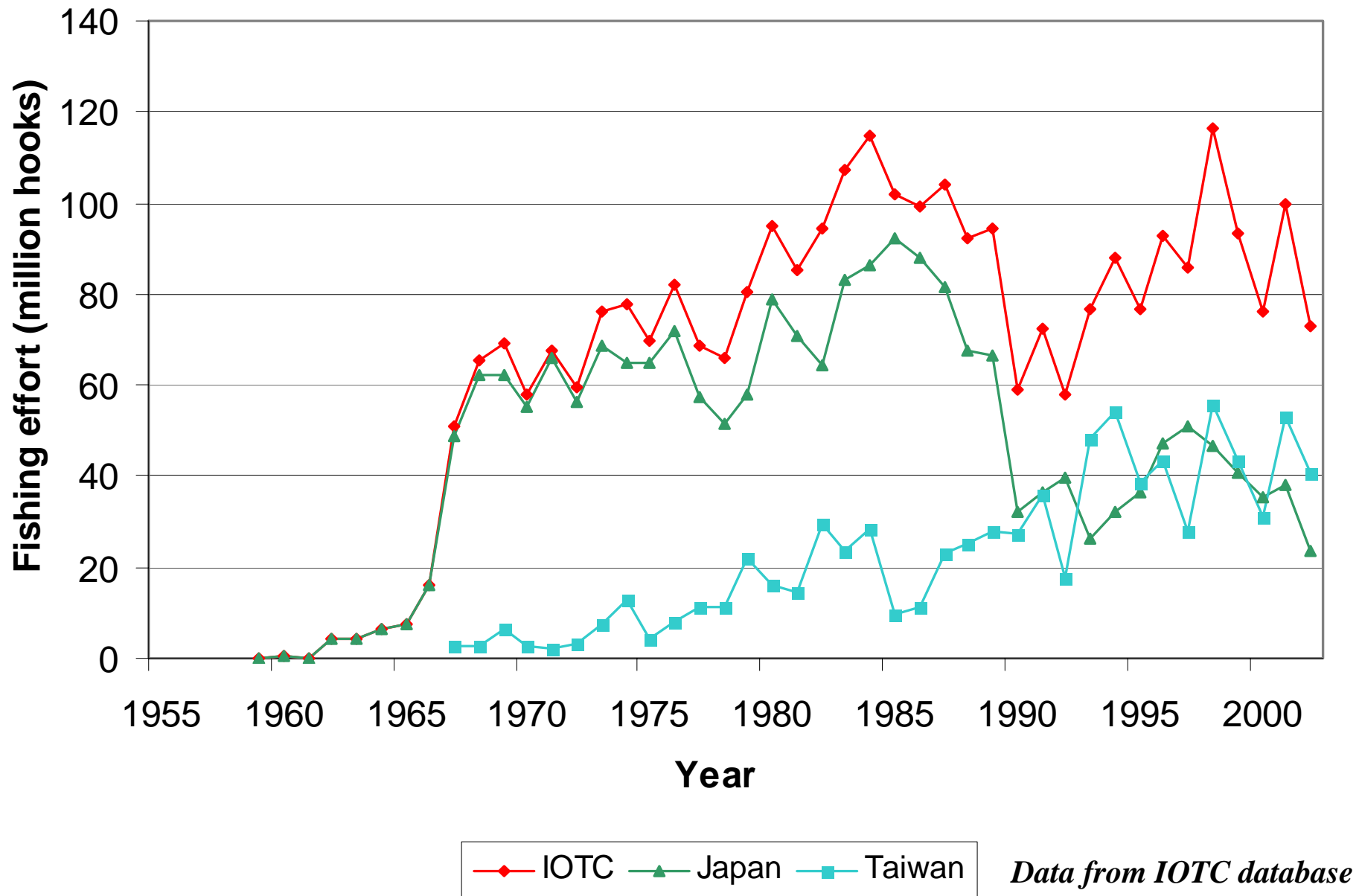


- Non-breeders further north than breeding birds.
- IOTC area also includes albatrosses migrating from Atlantic, Pacific & Southern Oceans

WHAT WE KNOW

2. OVERLAP WITH FISHING EFFORT

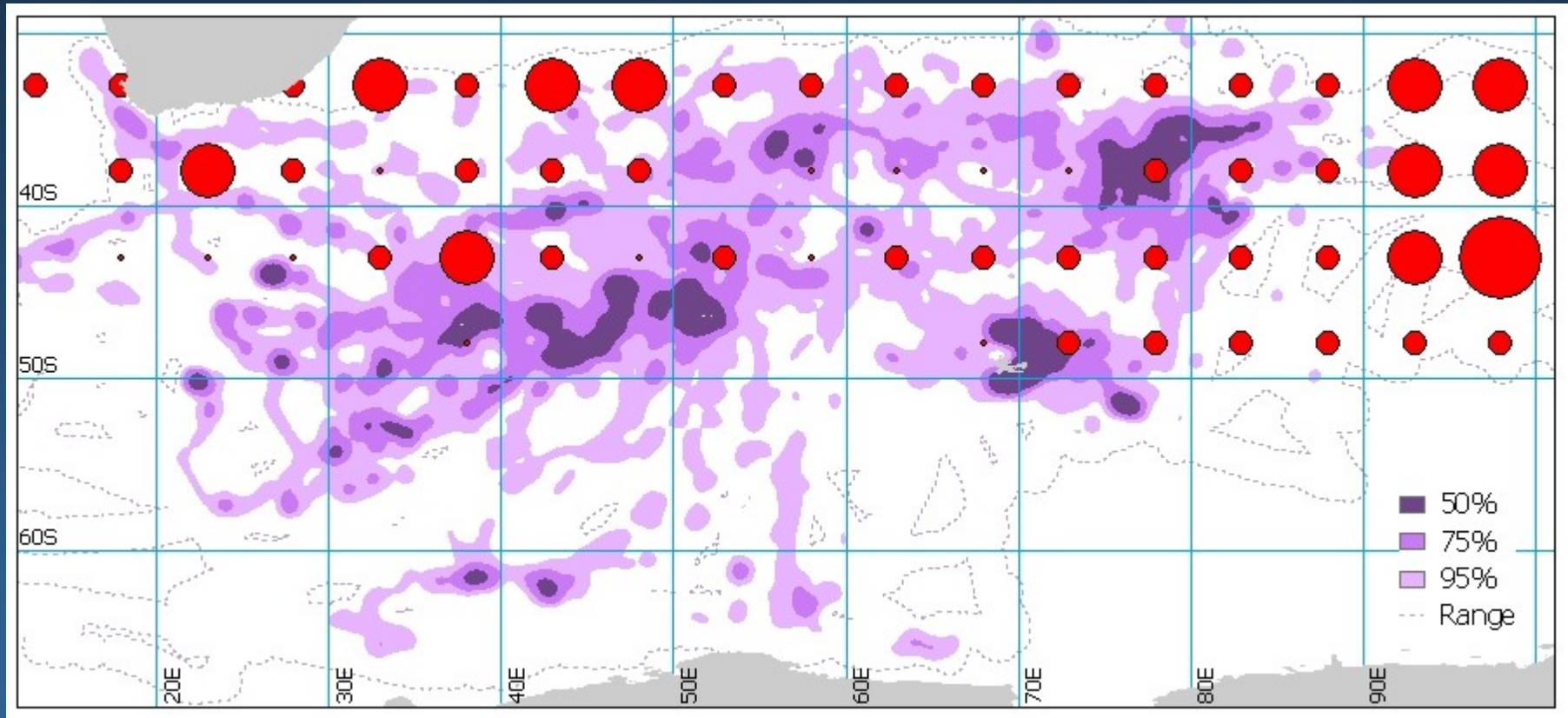
IOTC Pelagic Longline Fishing Effort below 30°S



Pelagic longline fishing effort below 30°S

(Tuck *et al* 2003)

1960s



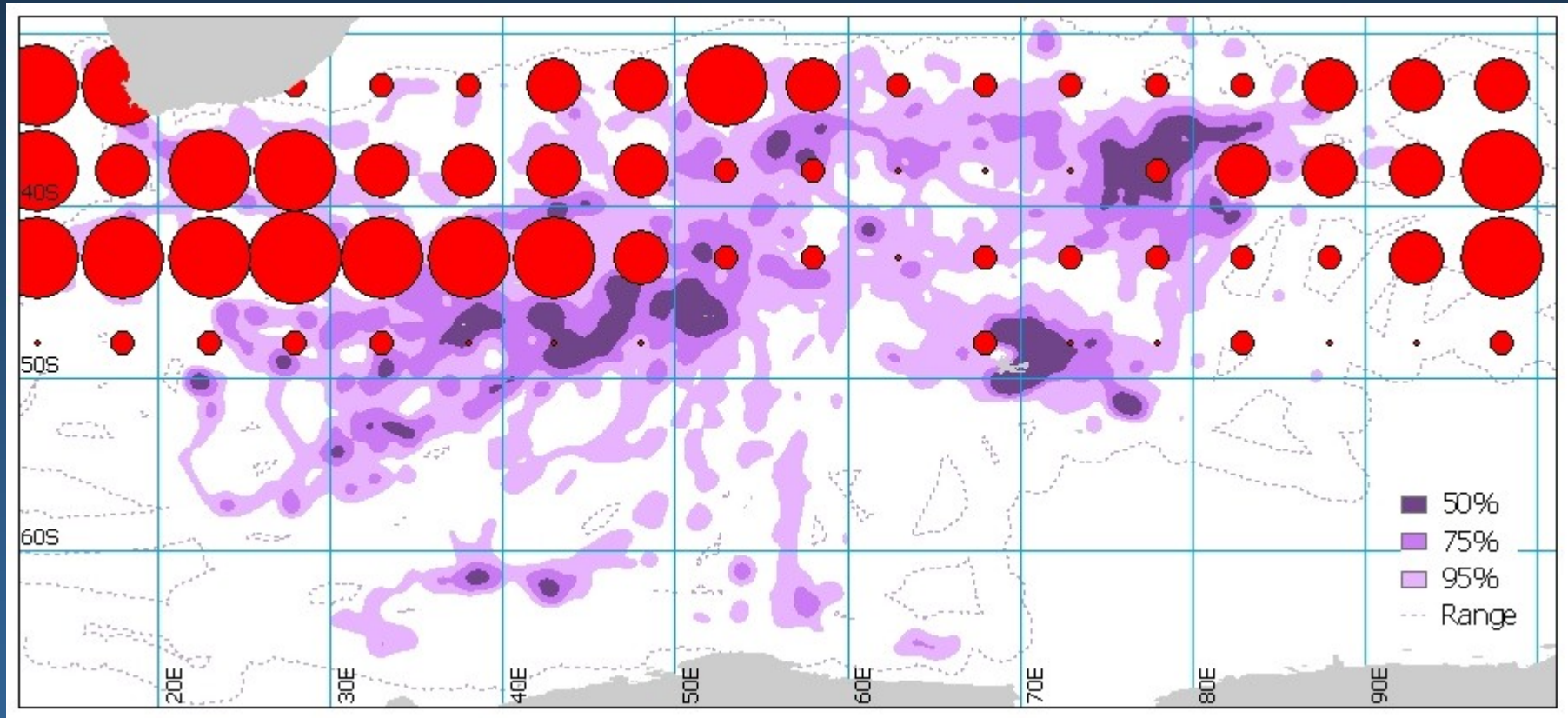
Annual fishing effort by 5 degree grid square (Tuck et al, 2003):

- 1-10,000 hooks; ● 10,000 - 250,000 hooks; ● 250,000 - 1 million hooks; ● 1 million - 4million hooks

Pelagic longline fishing effort below 30°S

(Tuck *et al* 2003)

1970s



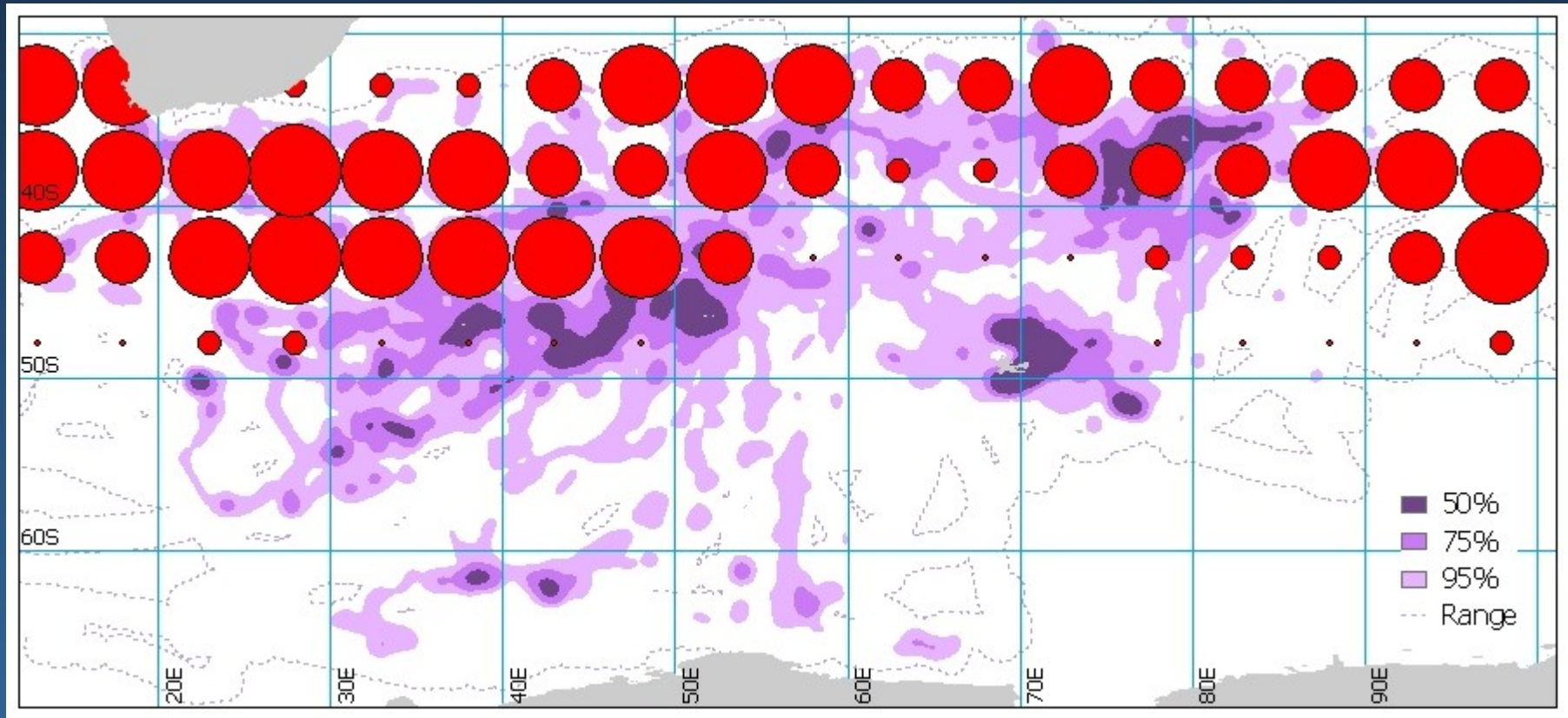
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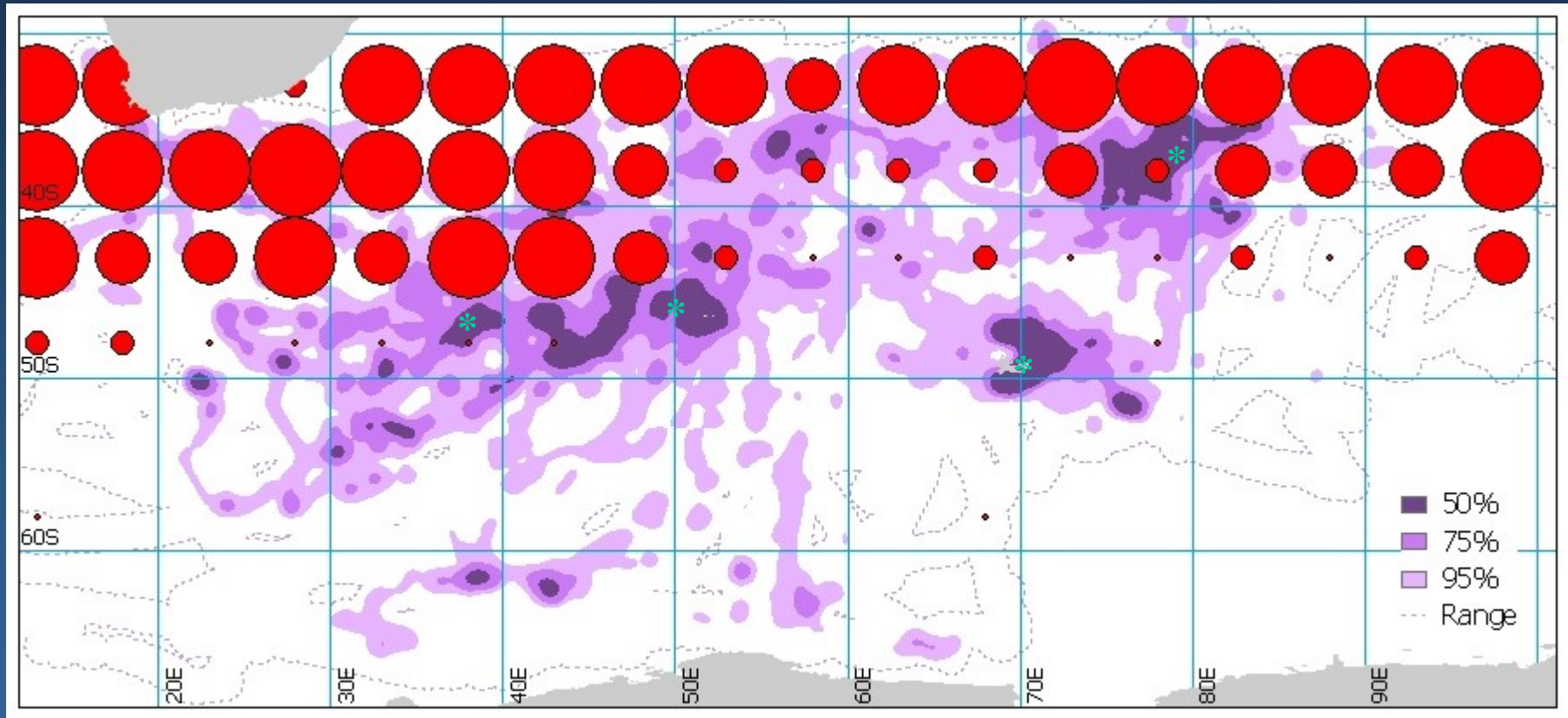
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Pelagic longline fishing effort below 30°S

(Tuck *et al* 2003)

1990s

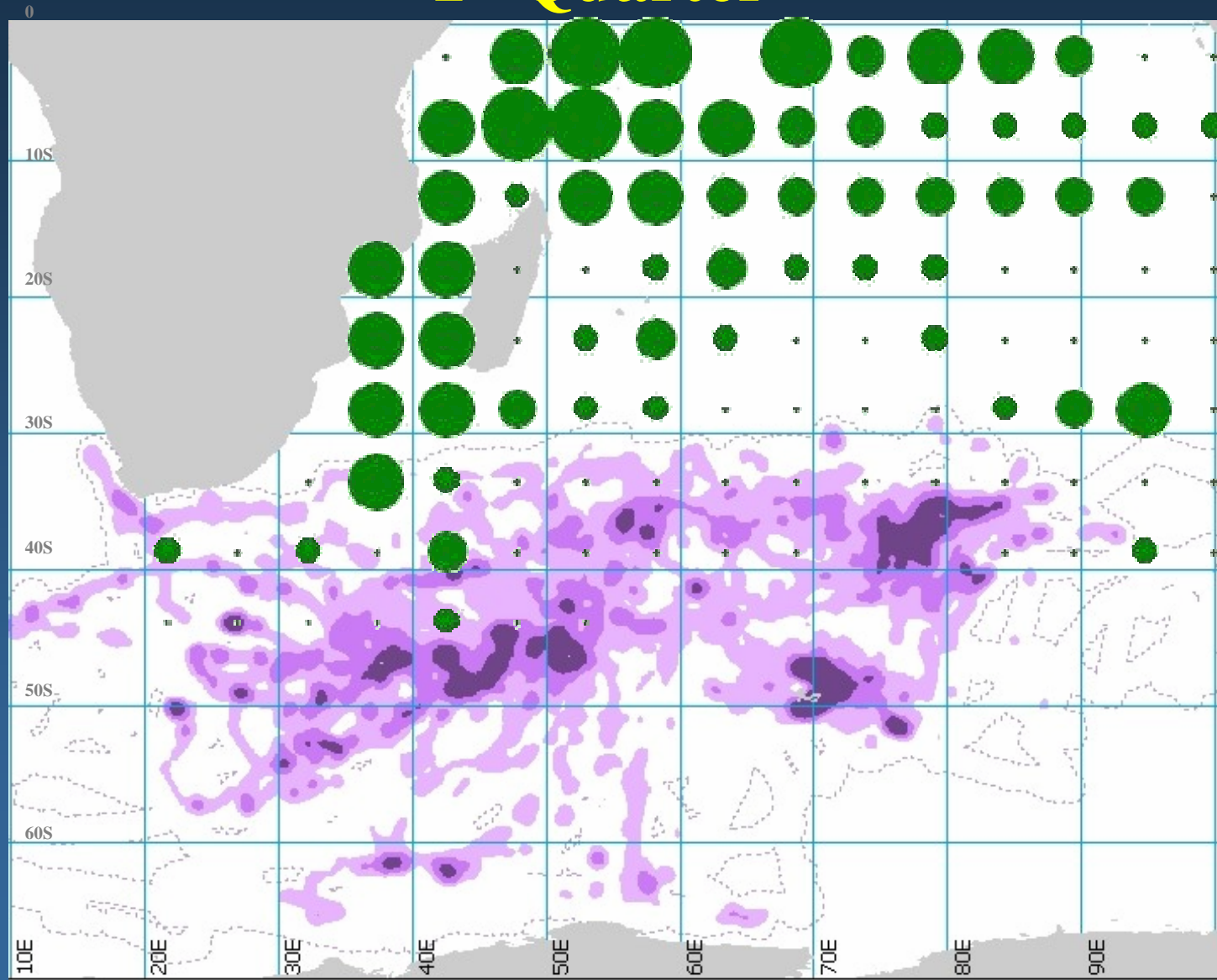


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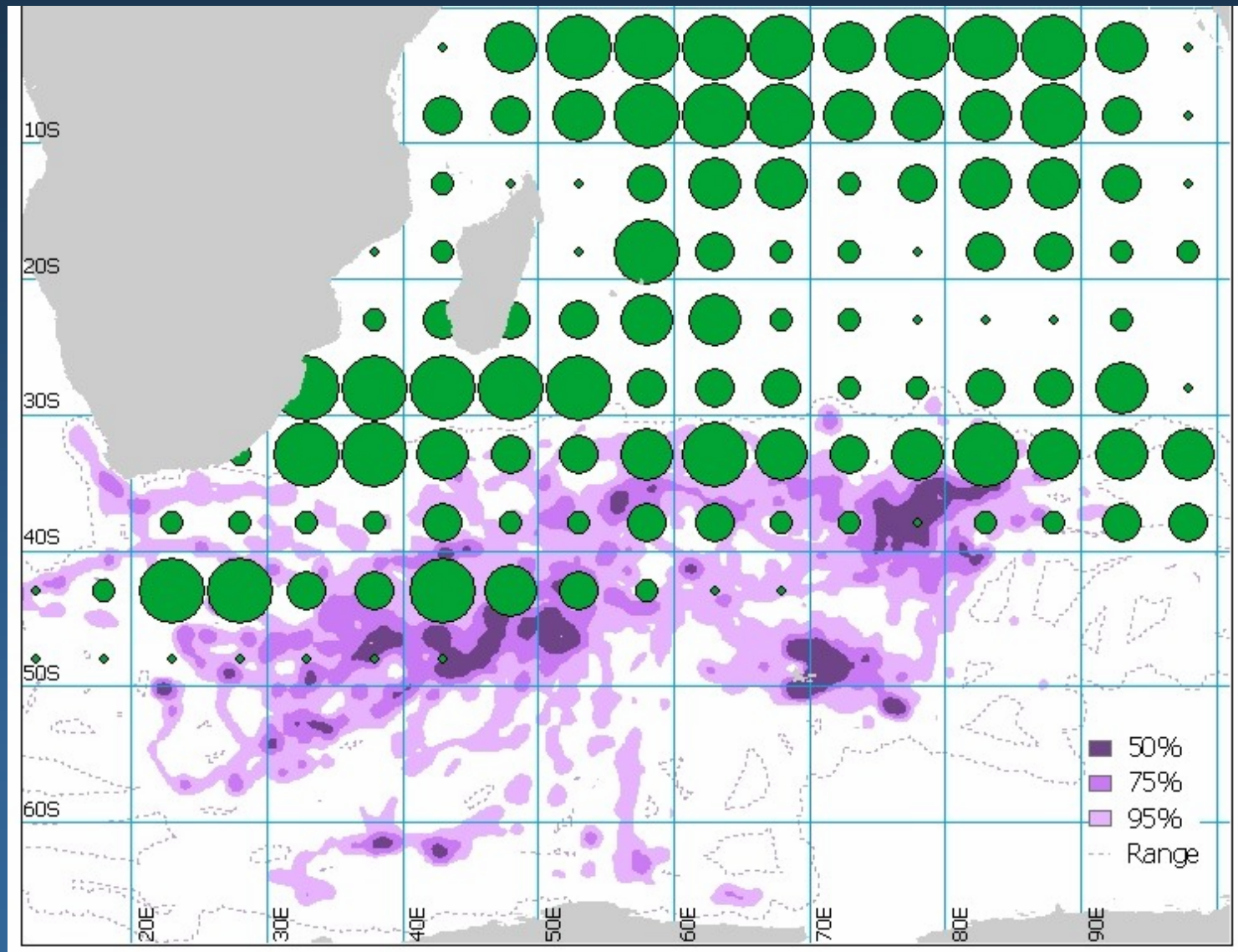
Fishing effort by Quarter (1999-2002)

1st Quarter



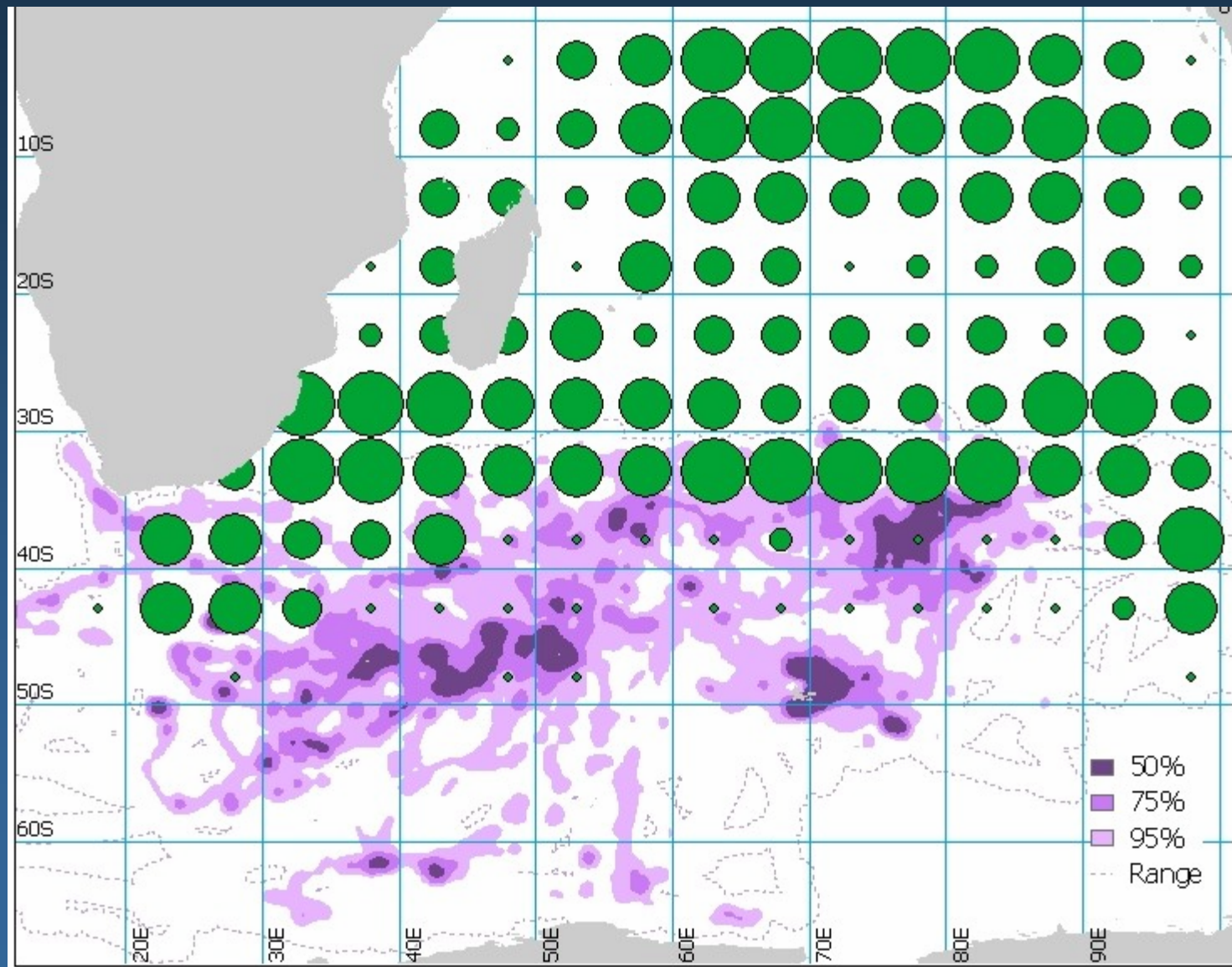
Fishing effort by Quarter (1999-2002)

2nd Quarter



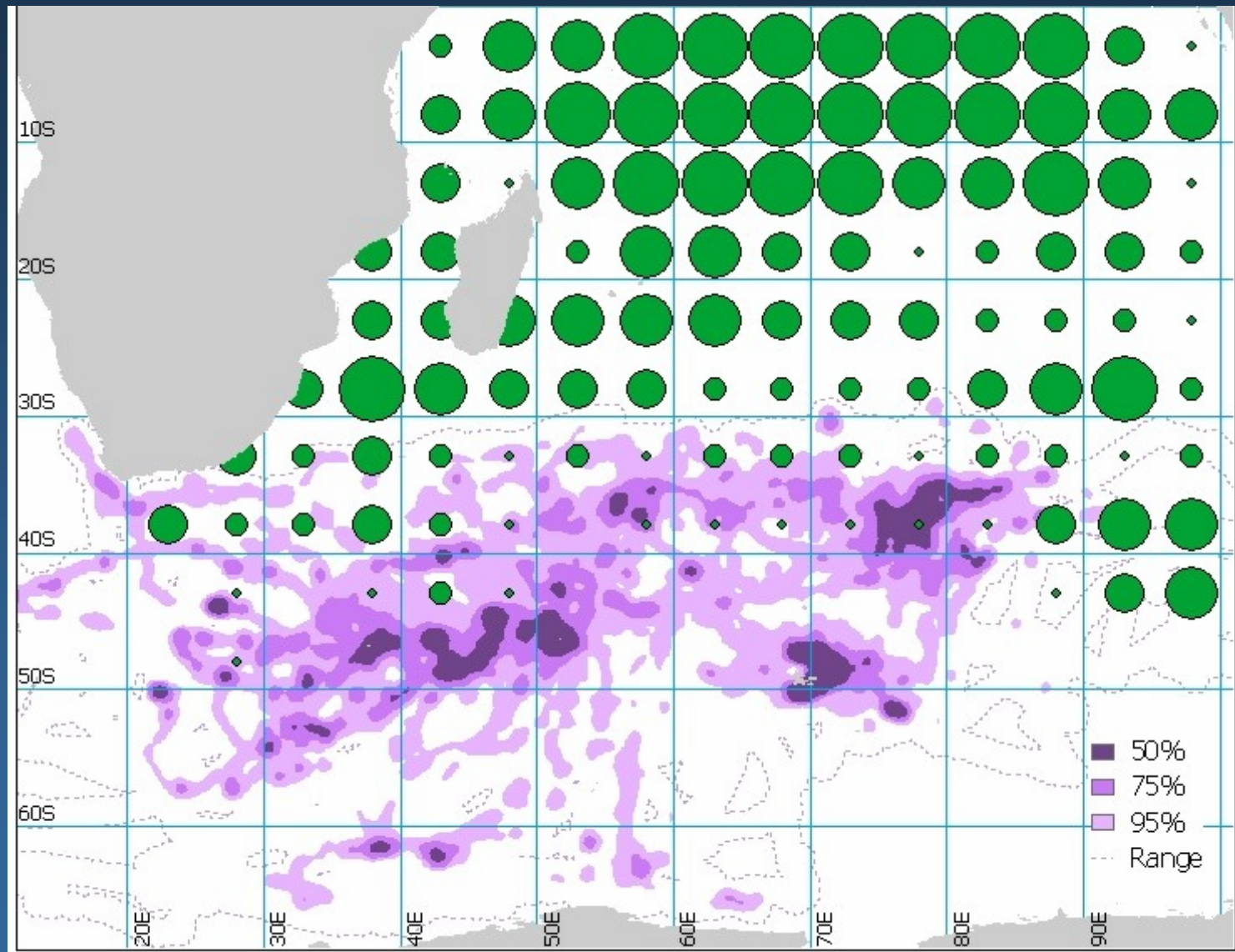
Fishing effort by Quarter (1999-2002)

3rd Quarter



Fishing effort by Quarter (1999-2002)

4th Quarter



WHAT WE KNOW

3. Albatross Population Models

- Seabird breeding population trends known
- Population models link seabird trends to longline effort in Southern Indian Ocean e.g. Prince Edward & Crozet populations (Nel *et al* 2001; Tuck *et al* 2001)
- Models are based on adult survival rates, not bycatch data



WHAT WE DON'T KNOW

Need more bycatch data

More complex than just overlay between albatrosses and fishing effort

Species have different catchability & not all fisheries pose same risk (fish at different times of the day and year)

Suggested recommendations

1. IOTC Recommendation on Seabirds - produce assessment

- **Set time frame for preliminary assessment**
- **IOTC collaboration with BirdLife and seabird experts from S. Indian Ocean**
- **Funding?**

Suggested recommendations

2. Strongly support need for regional observer program

- **Observer data standards**
- **Independent observers**
(CAMLIR's experience shows necessity)

Suggested recommendations

3. Mitigation measures below 30°S

Japan and Taiwan already require Tori lines south of 30°S. Require for other vessels south of 30°S, and standardise design.

4. Update of IOTC Convention

Opportunity to include commitment to minimising bycatch and observer program?

Summary

IOTC area of critical importance for albatross conservation

What we know

1. Distribution of albatrosses and petrels
 2. Overlap with fishing effort below 30°S (2nd & 3rd Quarter)
 3. Population models
 4. CCAMLR has demonstrated effectiveness of mitigation measures
-

Recommendations

- BYCATCH DATA: Strongly support need for regional observer program
- IOTC Recommendation on Seabirds – Timeline for preliminary assessment
- Mitigation measures below 30°S

UN Fish Stocks review 2006